Service Manual

NATIONAL
TAPE RECORDER
PANASONIC

CASSETTE RECORDER WITH BUILT-IN MICROPHONE AND AUTO-STOP

RQ-309S MECHANISM SERIES

MODEL RQ-309S

SPECIFICATIONS

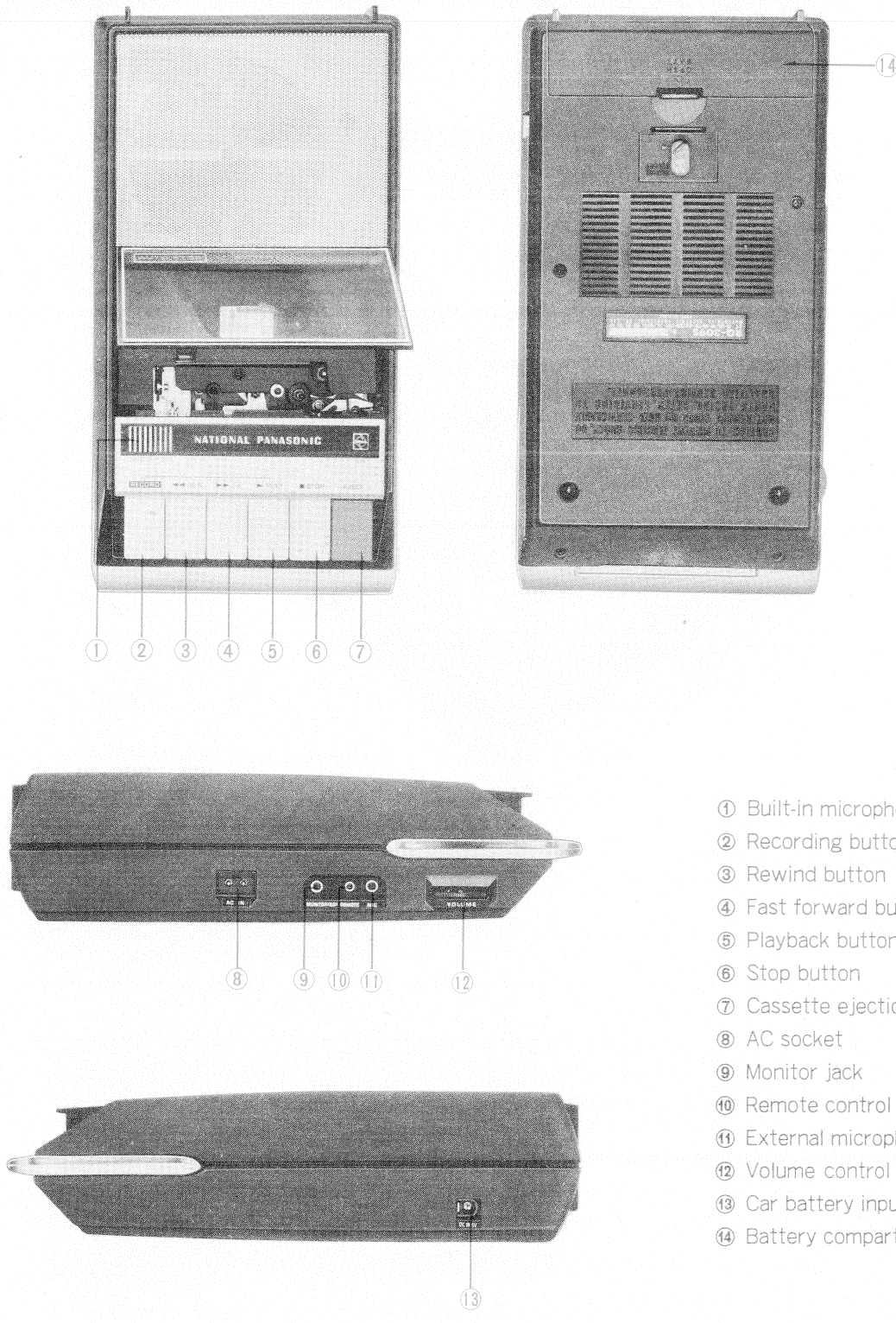
Power Source:	AC: 90~109, 110~125, 200~219, 220~250 volts; 50/60 Hz
	DC: 6 volts (four "C" size batteries): Car boat battery;(with NATIONAL PANASONIC optional car/boat adaptor RP-916)
Power Consumption:	5 W
Motor:	Mechanical governer motor
Max. Output:	1 W
Track System:	2-track, 1-channel, monaural
Recording System:	AC bias
Tape Speed:	1-7/8 ips. (4.8 cm/s)
Fast Forward Time:	Approx. 90 seconds with C-60 cassette
Rewind Time:	Approx. 90 seconds with C-60 cassette
Frequency Response:	80~8,000 Hz
Input:	"MIC" −72 dB 7.4 KΩ
Output:	"EXT SP" 8Ω
Recording Time:	One hour (two-way, using C-60 tape)
Speaker:	3-1/2″ PM dynamic type
Dimensions:	5-3/8″(W) × 2-3/4″(H) × 10-3/8″(D) 136mm(W) × 69mm(H) × 262mm(D)
Weight:	Approx. 3-7/8 lbs.

These specifications are subject to change in order to accommodate improvements in design.

MATSUSHITA ELECTRIC
MATSUSHITA ELECTRIC TRADING CO., LTD.
P. O. Box 288 Central, Osaka, Japan

ORDER NO. ARD-7211235

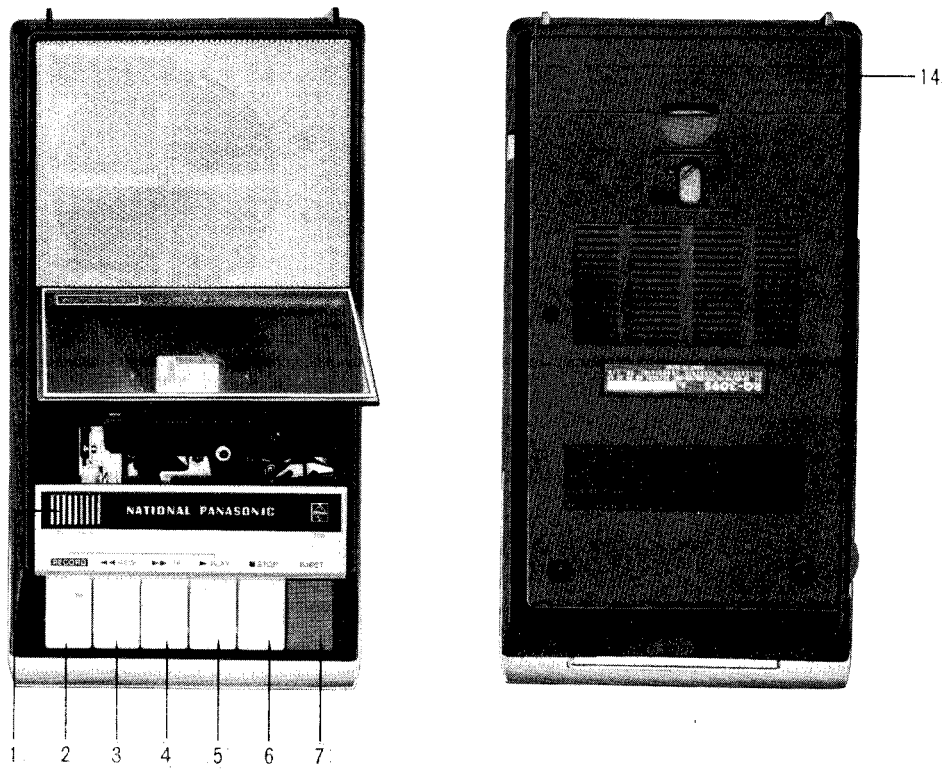
LOCATION OF PARTS

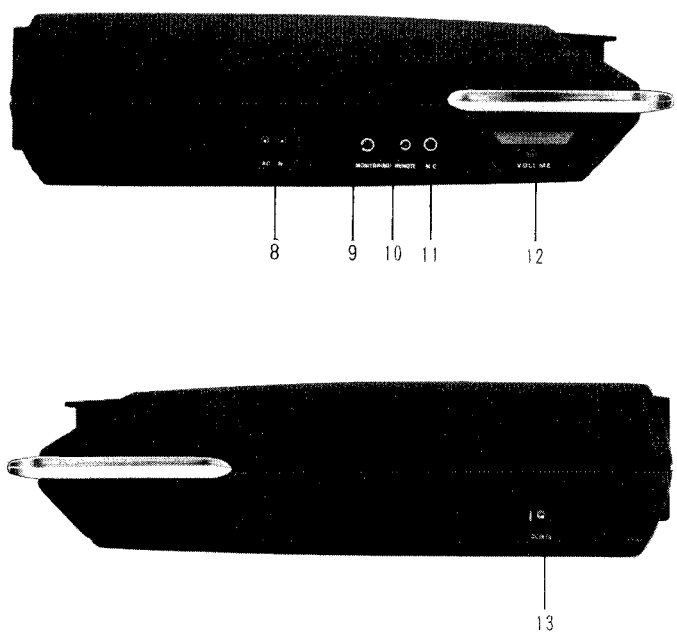


① Built-in microphone
② Recording button
③ Rewind button
④ Fast forward button
⑤ Playback button
⑥ Stop button
⑦ Cassette ejection button
⑧ AC socket
⑨ Monitor jack
⑩ Remote control jack
⑪ External microphone jack
⑫ Volume control knob
⑬ Car battery input jack
⑭ Battery compartment

Fig. 1

LOCATION OF PARTS





① Built-in microphone
② Recording button
③ Rewind button
④ Fast forward button
⑤ Playback button
⑥ Stop button
⑦ Cassette ejection button
⑧ AC socket
⑨ Monitor jack
⑩ Remote control jack
⑪ External microphone jack
⑫ Volume control knob
⑬ Car battery input jack
⑭ Battery compartment

Fig. 1

DISASSEMBLY INSTRUCTIONS

HOW TO REMOVE BOTTOM CASE

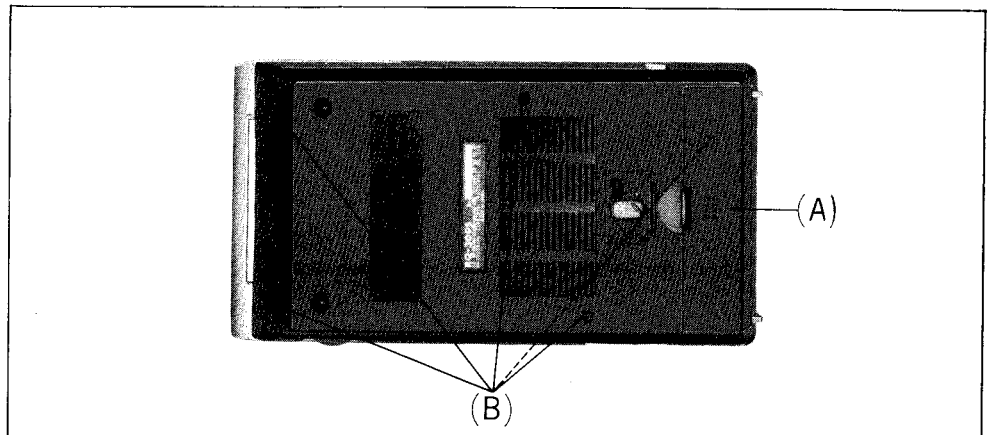


Fig. 2

1. Remove the battery cover (A).
2. Remove 5 bottom case holding screws (B).

HOW TO REMOVE CHASSIS

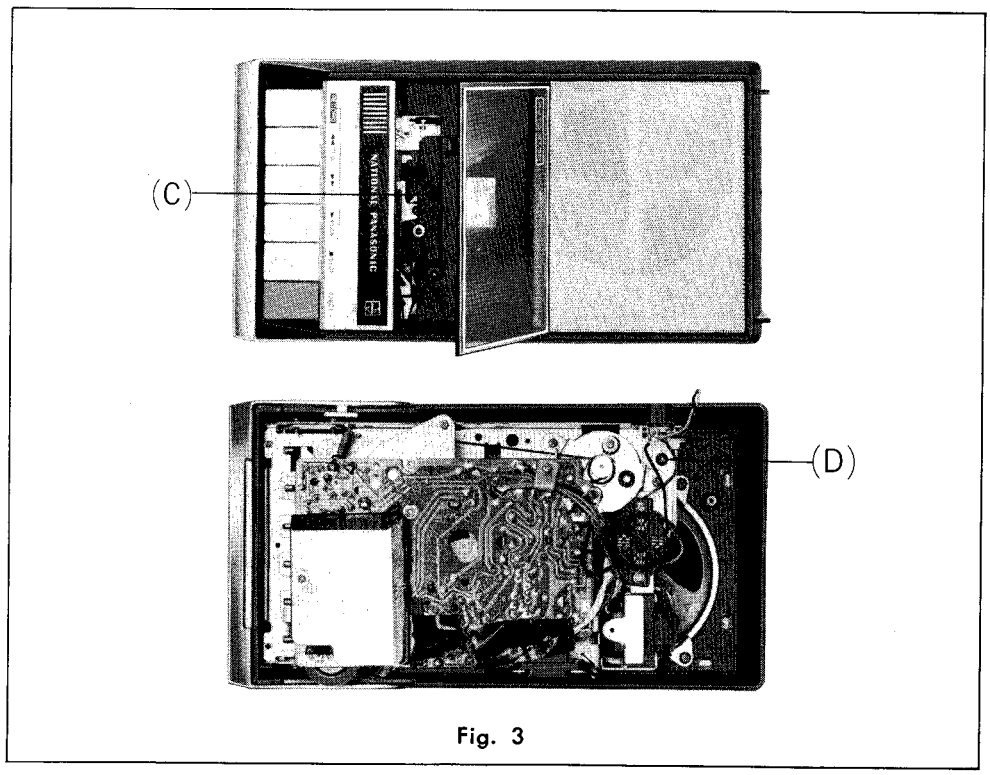


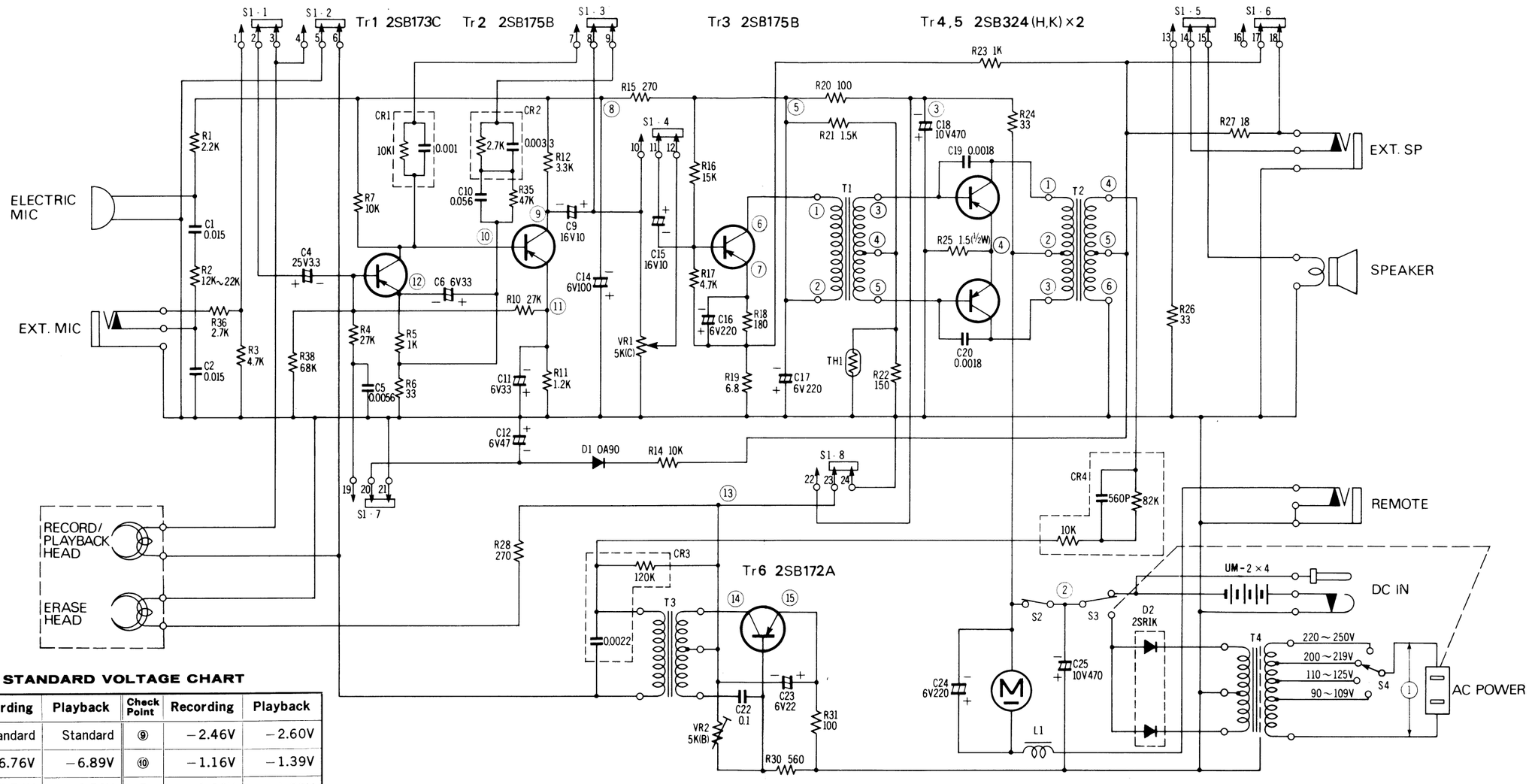
Fig. 3

1. Remove the body case holding screw (C).
2. Remove the chassis holding screw (D).
3. Open the cassette lid and take out the chassis.

STANDARD VALUE FOR TEST

	ITEM	VALUE	PARTS TO BE ADJUSTED	REMARKS
1	Recording bias current.	0.5±0.05 mA	VR2	——
2	Input level.	MIC −72±4 dB	——	To obtain 40μA of current through the head. Stop the bias oscillation by unsoldering point A shown in printed circuit board view on page 5.
3	Bias oscillation frequency.	45±5 kHz	——	——
4	Erase current.	8.5±1 mA	——	——
5	Wow & flutter.	RMS: 0.4%	——	——
6	Tape speed fluctuation.	±3%	——	——
7	Takeup tension.	65±15 gr-cm	——	——
8	Pressure of pressure roller.	400±50 gr	——	Measure the value at the moment when the pressure roller moves away from the capstan.
9	Tension of detect piece.	50±10 gr	——	——

SCHEMATIC DIAGRAM MODEL RQ-309S



STANDARD VOLTAGE CHART

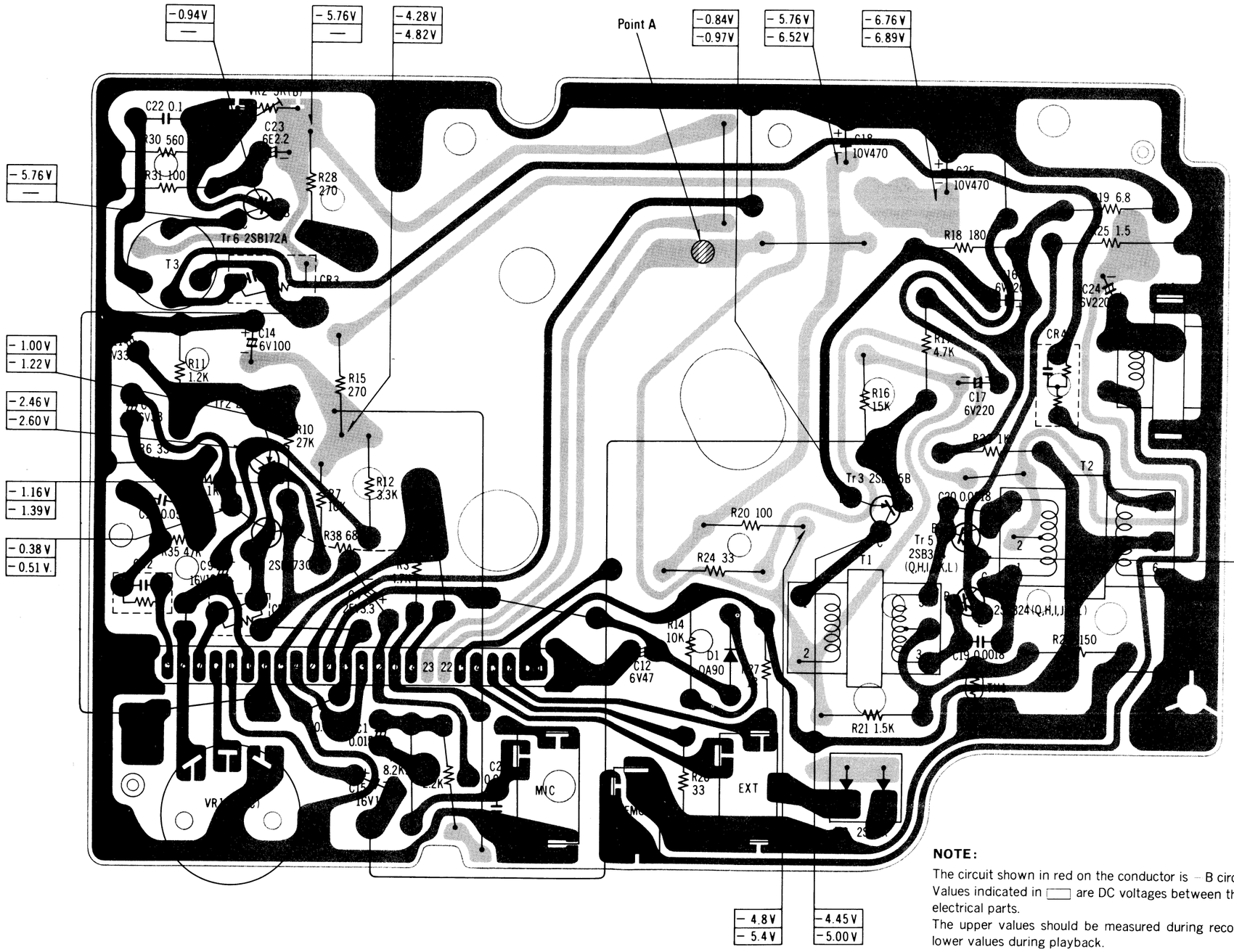
Check Point	Recording	Playback	Check Point	Recording	Playback
①	Standard	Standard	⑨	−2.46V	−2.60V
②	−6.76V	−6.89V	⑩	−1.16V	−1.39V
③	−5.76V	−6.52V	⑪	−1.00V	−1.22V
④	−0.014V	−0.020V	⑫	−0.38V	−0.51V
⑤	−4.8V	−5.4V	⑬	−5.76V	——
⑥	−4.45V	−5.00V	⑭	−5.76V	——
⑦	−0.84V	−0.97V	⑮	−0.94V	——
⑧	−4.28V	−4.82V			

NOTE: All measurements are under no signal conditions with volume at minimum position.
Use VTVM for voltage measurements.

NOTE:

1. S1-1~S1-8 ..... Record/playback select switch.
2. S2 ..... Power ON/OFF switch.
3. S3 ..... AC/DC select switch.
4. S4 ..... AC voltage select switch.
5. VR1 ..... Volume control.
6. VR2 ..... Bias adjust VR.
7. Resistors are ohms (Ω), 1/4 watt unless specified otherwise.
   K=1,000Ω.
8. Capacitors are microfarad (μF) unless specified otherwise.
   P=Pico-farads.
9. Encircled numbers (○) show the checkpoints for voltage.
   The values are marked in the standard voltage chart.

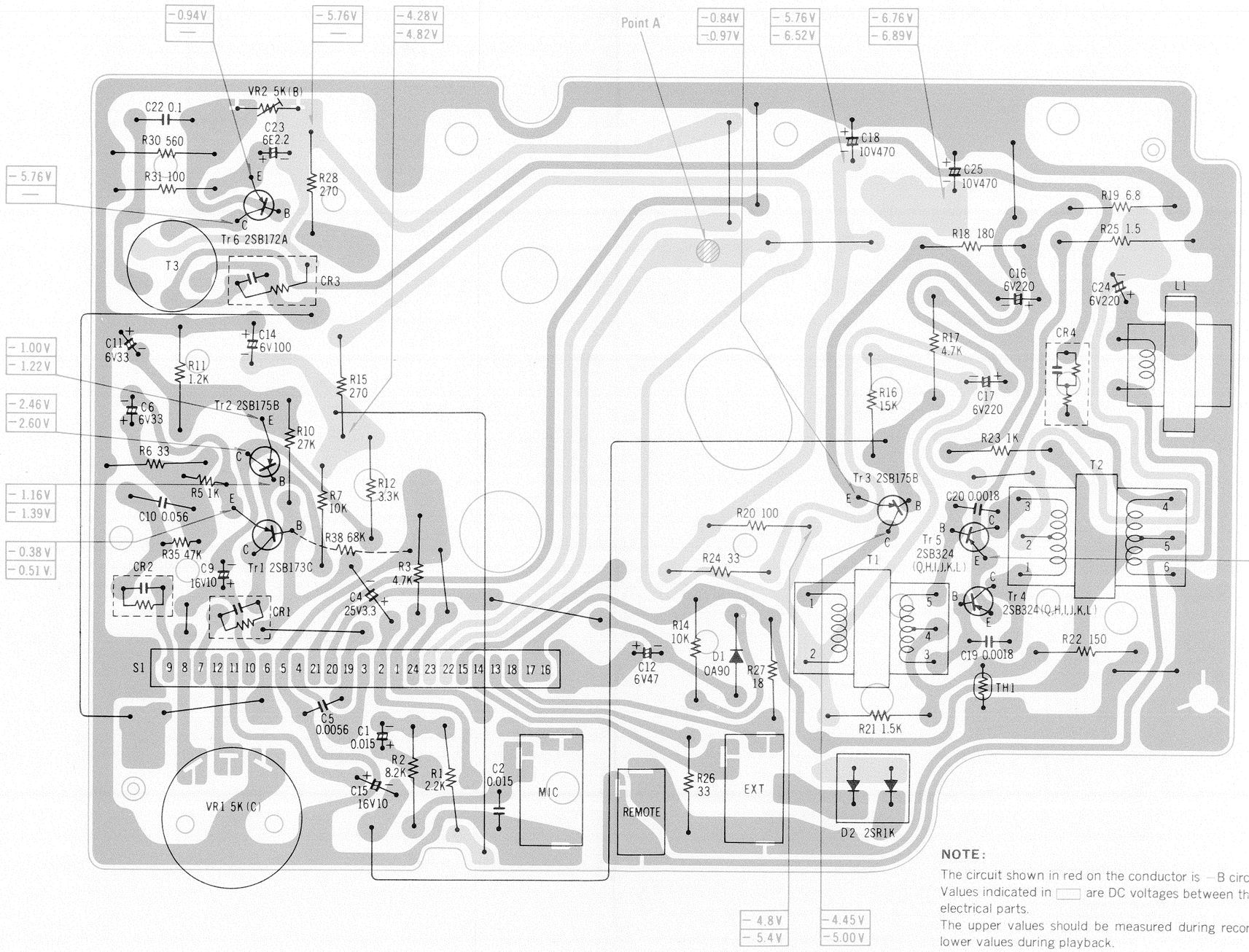
CIRCUIT BOARD



NOTE:

The circuit shown in red on the conductor is − B circuit.
Values indicated in ▭ are DC voltages between the chassis and electrical parts.
The upper values should be measured during recording and the lower values during playback.

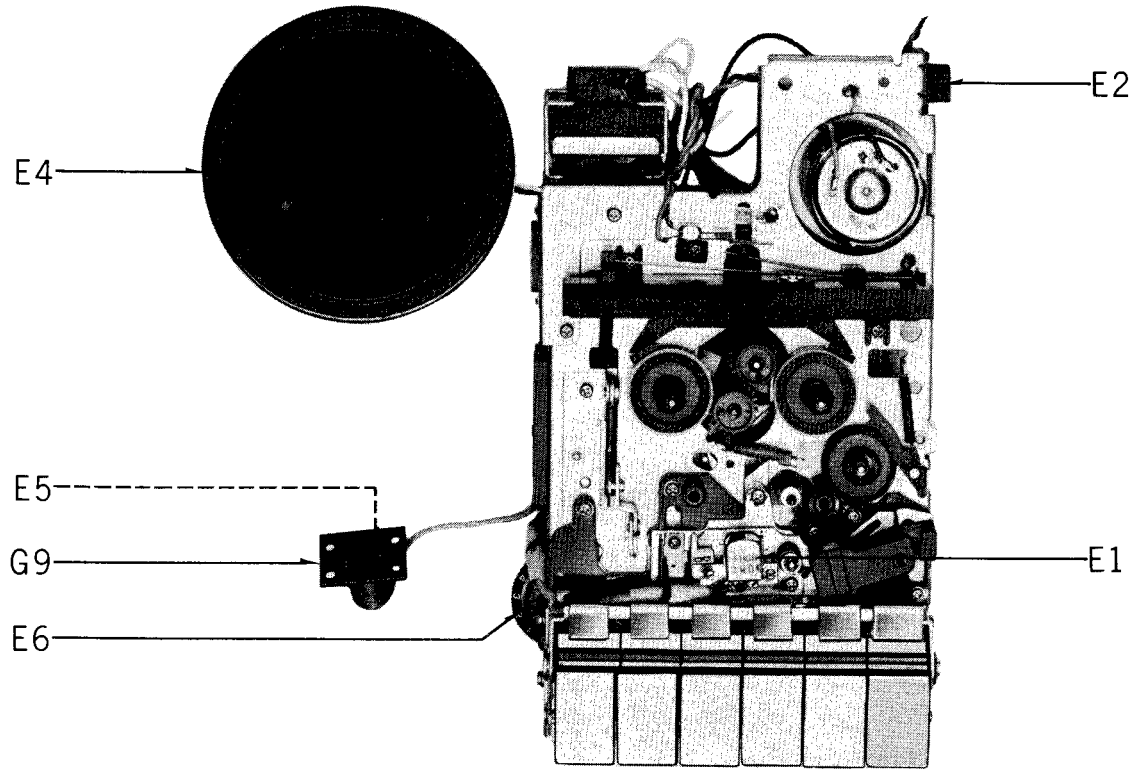
CIRCUIT BOARD

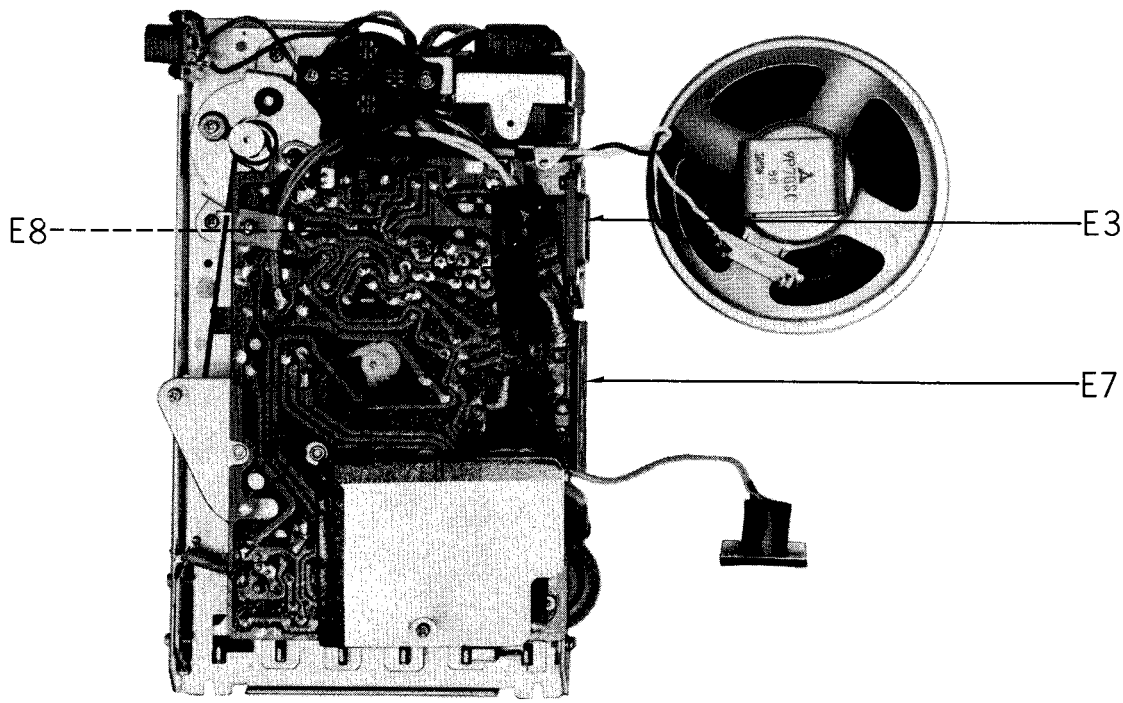


NOTE:

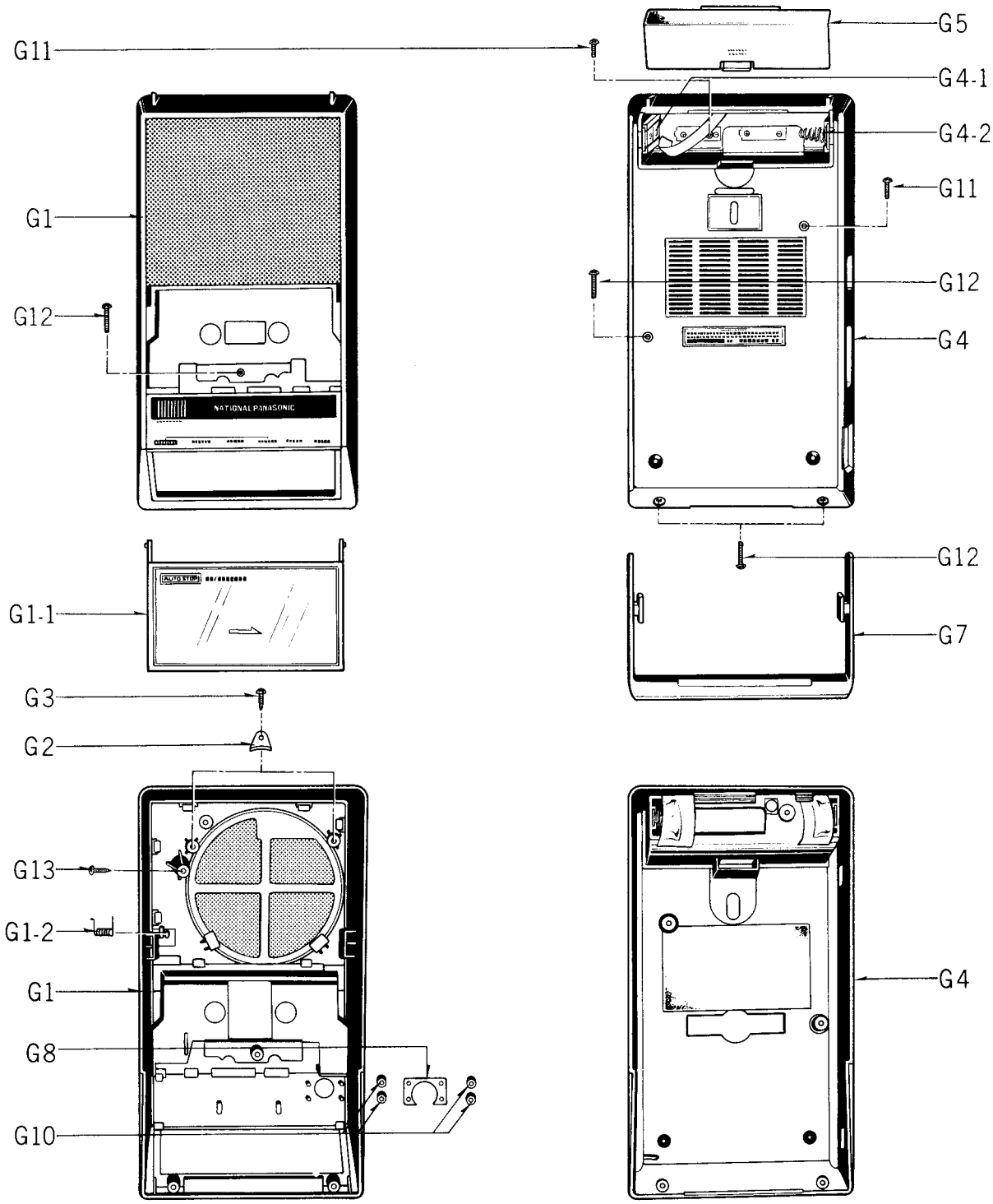
The circuit shown in red on the conductor is −B circuit.
Values indicated in ▭ are DC voltages between the chassis and electrical parts.
The upper values should be measured during recording and the lower values during playback.

ELECTRICAL PARTS LOCATION

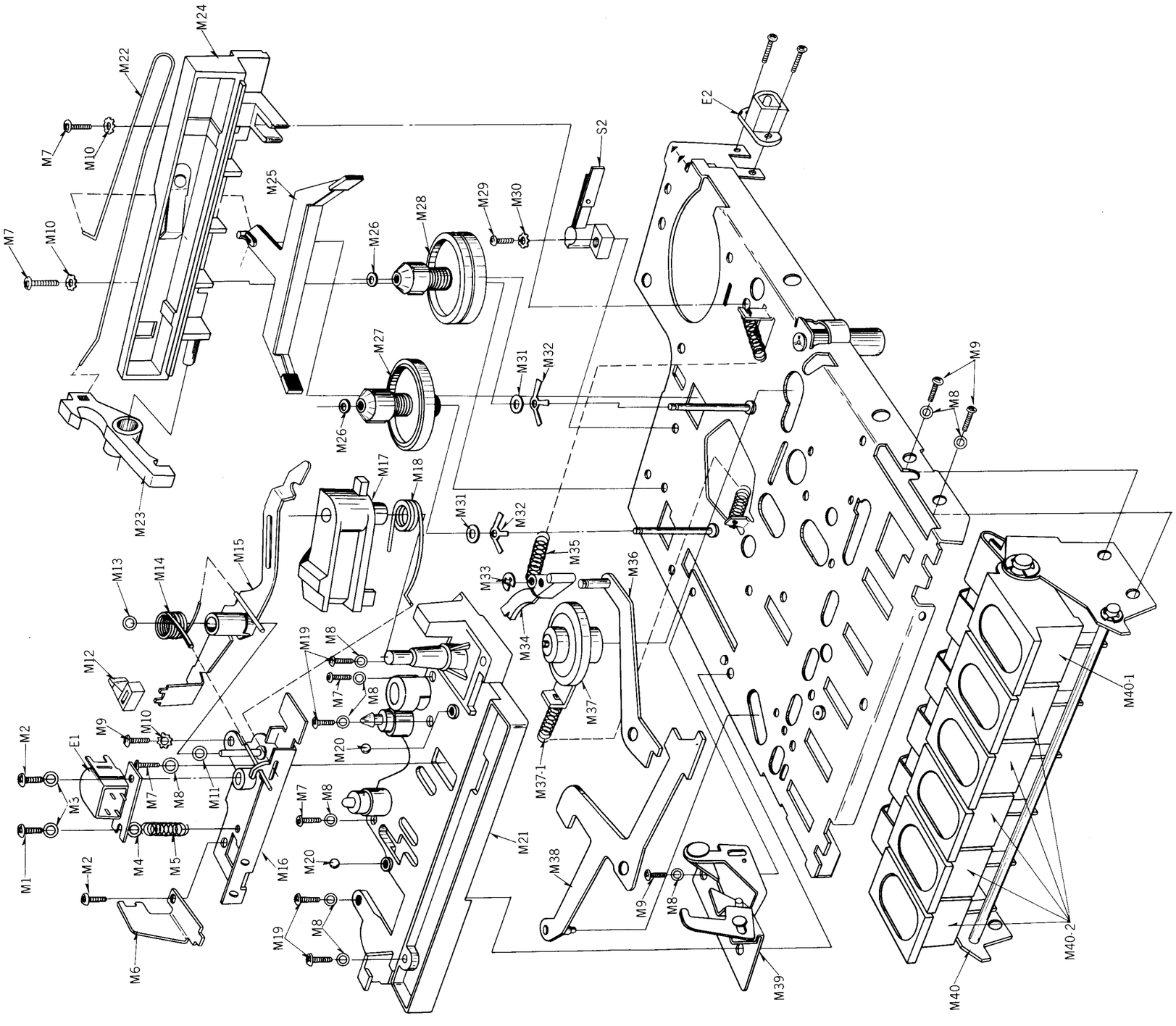


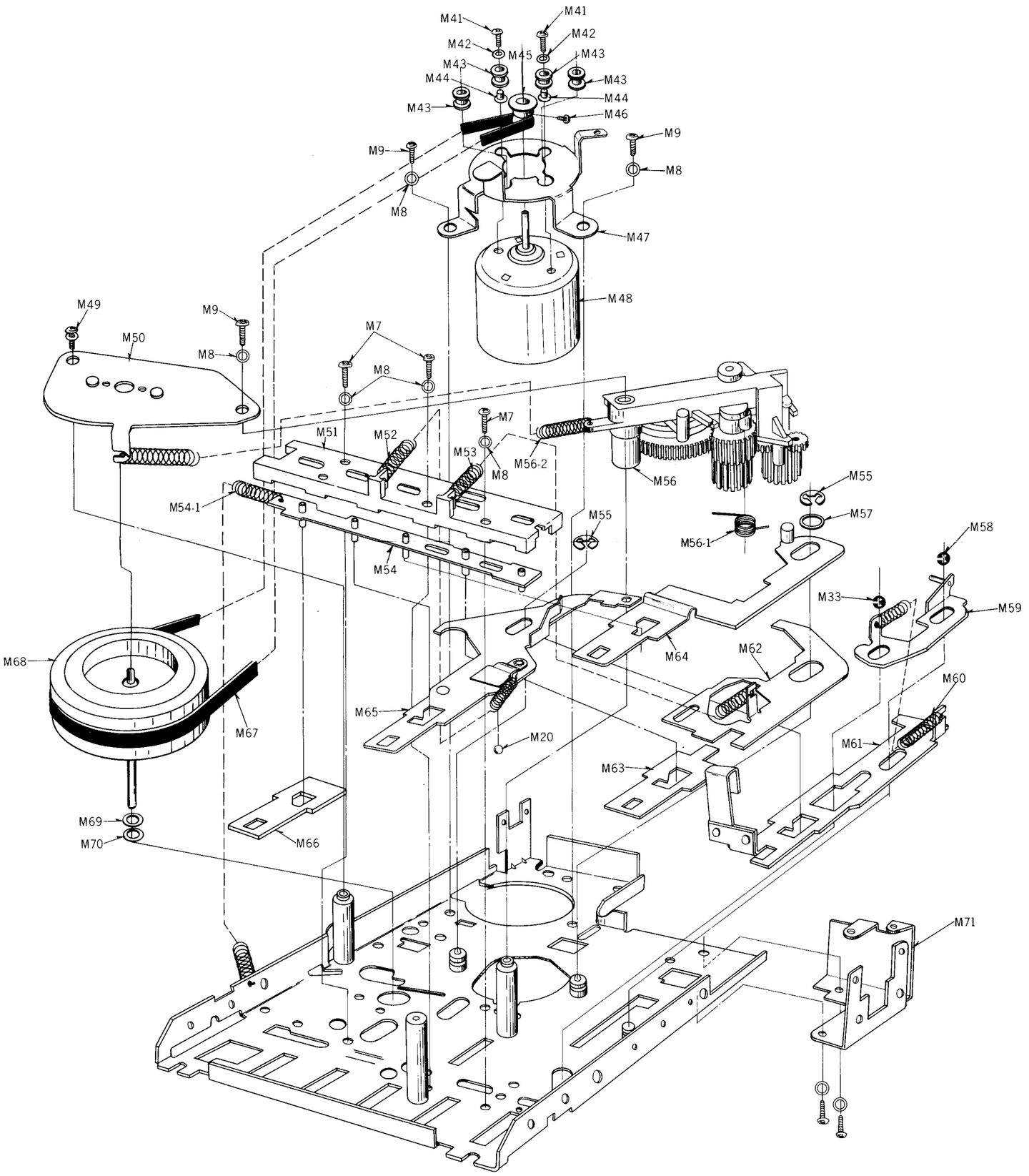


CABINET PARTS



EXPLODED VIEWS



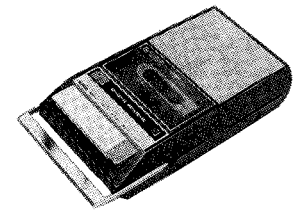


Printed in Japan

REPLACEMENT PARTS LIST

MODEL RQ-309S

NATIONAL PANASONIC



RQ-309S

NOTE:

1. Be sure to make your orders of Replacement Parts according to this List.
2. "×" in "Rank" Column indicates that the part are not supplyable.
3. "**A**, **B** and **C**" in "Rank" Column indicates the recommended stock of replacement parts. Refer to the recommended stock table on last page.
4. "★" in "Remarks" Column indicates New Parts.
5. "ISO" in "Remarks" Column indicates ISO Screw or Nut.

NOTA:

1. Habrá que asegurarse que los pedidos de piezas de repuesto se hagan según esta lista.
2. "×" marcado en la columna "Rank", quiere decir que dichas piezas no pueden ser provistas.
3. "**A**, **B** y **C**" marcadas en la columna "Rank" indican el surtido que se recomienda tener de dichas piezas de repuesto.
4. "★" marcado en la columna "Remarks", quiere decir que las piezas son nuevas.
5. "ISO" marcado en la columna "Remarks", quiere decir que es un tornillo o tuerca "ISO".

NOTE:

1. Bien s'assurer de se conformer à la liste suivante pour les commandes de pièces de rechange.
2. "×", dans la colonne "Rank", indique qu'il n'est pas possible de fournir ces pièces.
3. "**A**, **B** et **C**", dans la colonne "Rank", indiquent le stock recommandé de pièces de rechange. Se reporter en dernière page au tableau des stocks/recommandés.
4. "★", dans la colonne "Remarks", indique les pièces nouvelles.
5. "ISO", dans la colonne "Remarks", indique une vis ou un écrou ISO.

HINWEIS:

1. Bestellen Sie Ihre Ersatzteile genau nach dieser Liste.
2. Mit "×" in der "Rank" Spalte aufgeführte Teile können nicht geliefert werden.
3. "**A**, **B** und **C**" in der "Rank" Spalte zeigt Ihnen den Vorrat der Ersatzteile an.
4. "★" in der "Remarks" Spalte bedeutet "neue Teile".
5. "ISO" in der "Remarks" Spalte bedeutet ISO-Schraube oder Mutter.

按：

1. 關於代用零件之訂購，務請依照此表而行之爲荷。
2. 「等級」(Rank) 一欄中之 "×" 標記表示該零件無從供應。
3. 「等級」(Rank) 一欄中之 "**A**, **B**, **C**" 標記表示該零件有存貨，值得介紹。
   請參照最後一頁的「值得介紹存貨表」。
4. 「備考」(Remarks) 一欄中之 "★" 形符號標記表示該零件爲新出品。
5. 「備考」(Remarks) 一欄中之 "ISO" 符號標記表示國際標準化機構 (ISO) 式螺絲或螺母。

Rank	Ref. No.	Description	Part No.	Pcs/ Set	Price (Per Pce.)		Remarks
		MECHANICAL PARTS					
C	M1	Screw ⊖2×10	XSN2−10	1			COMMON
C	M2	Screw ⊕2×4	XSN2+4	3			"
C	M3	Spring Washer 2φ	XWA2B	1			"
C	M4	Flat Washer 2φ	XWE2	1			"
C	M5	Head Spring	QBC1157	1			RQ-409S
C	M6	Tape Guide	QAG1178	1			RQ-409S
C	M7	Screw ⊕2.6×8	XSN26+8	8			COMMON
C	M8	Spring Washer 2.6φ	XWA26B	17			"
C	M9	Screw ⊕2.6×6	XSN26+6	8			"
C	M10	Lock Washer 2.6φ	XWC26B	3			"
C	M11	Tetoron Washer 2.1×4×0.3	QBJ3107	1			RQ-209S
B	M12	Detecting Piece	QBJ1538	1			RQ-222AS, 409S, 437S
C	M13	Snap Washer	QWQ1124	1			RQ-409S, 437S
C	M14	Auto Stop Detect Lever Spring	QBN1188	1			RQ-409S
C	M15	Auto Stop Detect Lever Unit	QXLK0102	1			"
×	M16	Head Base Plate Unit	QXKK0057	1			RQ-409S
C	M17	Pressure Roller Lever Assembly	QXLK0116	1			★
B	M18	Pressure Roller Lever Spring	QBN1157	1			RQ-409S, 437S
C	M19	Screw ⊕2.6×10	XSN26+10	4			COMMON
B	M20	Steel Ball 2.5φ	QDK1012	3			RQ-409S, 437S
×	M21	Upper Base Plate Unit	QXKK0056	1			RQ-409S
B	M22	Brake Spring	QBS1057	1			"
C	M23	Erase Safety Lever-B	QBJ1975	1			"
C	M24	Cassette Retainer Unit	QXQK0018	1			"
B	M25	Brake	QBJ1941	1			"
C	M26	Snap Washer	QWQ1124	2			RQ-409S, 437S
A	M27	Reel Table Assembly-L	QXP0320	1			RQ-409S
A	M28	Reel Table Assembly-R	QXP0319	1			"

Rank	Ref. No.	Description	Part No.	Pcs/ Set	Price (Per Pce.)		Remarks
C	M29	Screw ⊕2×5	XSN2+5	1			COMMON
C	M30	Lock Washer 2φ	XWC2B	1			〃
C	M31	Tetoron Washer	QBJ3224	2			RQ-409S
C	M32	Back Tension Spring	QBPK0032	2			〃
C	M33	Stop Ring 2.5φ	XUC25FT	2			COMMON
B	M34	Auto Stop Drive Pawl	QBJ1656	1			RQ-409S, 437S
C	M35	Auto Stop Spring	QBTK0014	1			〃
C	M36	Auto Stop Drive Lever Unit	QXLK0101	1			RQ-409S
B	M37	Idler Lever Assembly	QXLK0115	1			★
C	M37-1	Idler Lever Spring	QBTK0013	1			RQ-421S
C	M38	Eject Lever Unit	QXLK0099	1			RQ-409S
C	M39	Lid Lock Holder Unit	QXHK0030	1			〃
B	M40	Push Button Frame Assembly	QUBK0045	1			★
B	M40-1	Push Button	QBJK0080	1			★
B	M40-2	〃	QBJK0079	5			★
C	M41	Screw ⊕2.6×7	XSN26+7	2			COMMON
C	M42	Flat Washer 2.6φ	XWE26	2			〃
C	M43	Motor Cushion Rubber	QBG1373	4			★
C	M44	Eylet	QMSK0071	2			★
B	M45	Motor Pulley	QDP1378	1			RQ-409S, 437S
B	M46	Pulley Set Screw ⊕2×3	XSN2+3	1			COMMON
C	M47	Motor Holding Angle	QMHK0017	1			★
A	M48	Motor	QDM0653	1			★
C	M49	Screw	QHQK0009	1			RQ-409S
C	M50	Flywheel Retainer Unit	QXHK0029	1			RQ-409S
C	M51	Lever Guide	QBJK0090	1			★
C	M52	Playback Lever Spring	QBT1581M	1			RQ-409S
C	M53	Fast Forward Lever Spring	QBT1582M	1			RQ-409S
C	M54	Lock Plate Assembly	QXHK0031	1			〃

Rank	Ref. No.	Description	Part No.	Pcs/ Set	Price (Per Pce.)		Remarks
C	M54-1	Lock Plate Spring	QBT1584M	1			RQ-409S
C	M55	Stop Ring 5φ	XUC5FY	2			COMMON
C	M56	Fast Forward Frame Assembly	QXL0451	1			RQ-409S, 437S
C	M56-1	Gear Lever Spring	QBN1196	1			RQ-409S, 437S
C	M56-2	Fast Forward Frame Spring	QBTK0011	1			RQ-409S, 436S
C	M57	Fiber Washer 6.2×11×1	QBK7130	1			COMMON
C	M58	Stop Ring 3φ	XUC3FK	1			"
C	M59	Cassette Up Rod Unit	QXMK0018	1			RQ-409S
C	M60	Record Lever Spring	QBT1583T	1			RQ-409S
C	M61	Record Lever Unit	QXLK0098	1			"
C	M62	Fast Forward Lever-2	QML2118	1			"
C	M63	Rewind Lever	QML2257	1			"
C	M64	Fast Forward Lever-A Unit	QXLK0097	1			"
C	M65	Playback Lever Unit	QXLK0096	1			RQ-409S
C	M66	Stop Lever	QML2258	1			"
A	M67	Flywheel Belt	QDB0141	1			RQ-409S, 437S
A	M68	Flywheel	QXFK0005	1			★
C	M69	Snap Washer	QBJ3220	1			RQ-409S
C	M70	Tetoron Washer	QBJ3221	1			RQ-409S
C	M71	Transformer Angle	QMA1742	1			★
		RESISTORS					
B	R1	Carbon Resistor 2.2KΩ 1/4 W	ERD14TJ222	1			
B	R2	" 8.2KΩ 1/4 W	ERD14TJ822	1			
B	R3, 17	" 4.7KΩ 1/4 W	ERD14TJ472	2			
B	R4, 10	" 27KΩ 1/4 W	ERD14TJ273	2			
B	R5	" 1KΩ 1/4 W	ERD14VJ102	1			
B	R6, 24, 26	Carbon Resistor 33Ω 1/4 W	ERD14TJ330	3			
B	R7, 14	" 10KΩ 1/4 W	ERD14TJ103	2			
B	R11	" 1.2KΩ 1/4 W	ERD14TJ122	1			

Rank	Ref. No.	Description	Part No.	Pcs/ Set	Price (Per Pce.)		Remarks
B	R12	Carbon Resistor 3.3KΩ 1/4W	ERD14TJ332	1			
B	R15, 28	" 270Ω 1/4W	ERD14TJ271	2			
B	R16	Carbon Resistor 15KΩ 1/4W	ERD14TJ153	1			
B	R18	" 180Ω 1/4W	ERD14TJ181	1			
B	R19	" 6.8Ω 1/4W	ERD14TJ6R8	1			
B	R20, 31	" 100Ω 1/4W	ERD14TJ101	2			
B	R21	" 1.5KΩ 1/4W	ERD14TJ152	1			
B	R22	Carbon Resistor 150Ω 1/4W	ERD14TJ151	1			
B	R23	" 1KΩ 1/4W	ERD14TJ102	1			
B	R25	Wire-wound Resistor 1.5Ω 1/2W	ERM12PK1R5	1			
B	R27	Carbon Resistor 18Ω 1/4W	ERD14TJ180	1			
B	R30	" 560Ω 1/4W	ERD14TJ561	1			
B	R35	Carbon Resistor 47KΩ 1/4W	ERD14VJ473	1			
B	R36	" 2.7KΩ 1/4W	ERD14VJ272	1			
B	R38	" 68KΩ 1/4W	ERD14TJ683	1			
		VARIABLE RESISTORS					
A	VR1	Variable Resistor 5KΩ (C)	EVJA2AT12C53	1			RQ-209DAS
A	VR2	Semi-fixed Resistor 5KΩ (B)	EVLT8AA00B53	1			★
		CAPACITORS					
C	C1, 2	Mylar Capacitor 0.015μF	ECQM05153MZ	2			
B	C4	Electrolytic Capacitor 3.3μF	ECEA25V3R3L	1			
C	C5	Mylar Capacitor 0.0056μF	ECQM05562MZ	1			
B	C6, 11	Electrolytic Capacitor 33μF	ECEA6V33L	2			
B	C9, 15	" 10μF	ECEA16V10L	2			
C	C10	Mylar Capacitor 0.056μF	ECQM05563MZ	1			
B	C12	Electrolytic Capacitor 47μF	ECEA6V47L	1			
B	C14	" 100μF	ECEA6V100L	1			
B	C16, 17, 24	" 220μF	ECEA6V220L	3			
B	C18, 25	" 470μF	ECEA10V470L	2			

Rank	Ref. No.	Description	Part No.	Pcs/ Set	Price (Per Pce.)		Remarks
C	C19, 20	Mylar Capacitor 0.0018μF	ECQM05182MZ	2			
C	C22	" 0.1μF	ECQM05104MZ	1			
C	C23	Aluminum Capacitor 2.2μF	ECAG6E2R2	1			
		COMBINATION PARTS					
B	CR1	CR Combination Part	QXAP102M124K	1			★
B	CR2	"	QXAP332N272K	1			★
B	CR3	"	QXAS222M124K	1			★
B	CR4	"	QXA3WL02	1			★
		TRANSISTORS					
A	Tr1	Transistor	2SB173C	1			COMMON
A	Tr2, 3	"	2SB175B	2			"
A	Tr4, 5	"	2SB324 (H, K)	2			"
A	Tr6	"	2SB172A	1			"
		DIODE & RECTIFIER					
A	D1	Diode	OA90Z	1			COMMON
A	D2	Silicon Rectifier	2SR1K	1			RQ-409S
		TRANSFORMERS					
A	T1	Input Transformer	QLA0122	1			RQ-209S
A	T2	Output Transformer	QLA0360	1			RQ-209DS,209MS
A	T3	Oscillator Transformer	QLB0135A	1			"
A	T4	Power Transformer	QLP0707	1			★
		COIL					
B	L1	Choke Coil	QLP0105	1			COMMON
		SWITCHES					
A	S1	Slide Switch (REC/PLAY)	QSS1176	1			★
A	S2	Leaf Switch (Power ON/OFF)	QSB0169B	1			RQ-209S, 409S
	S3	AC/DC Select Switch	Refer to E3	(1)			
A	S4	Rotary Switch (AC Voltage)	QSR0005B	1			COMMON

Rank	Ref. No.	Description	Part No.	Pcs/ Set	Price (Per Pce.)		Remarks
		THERMISTOR					
B	TH1	Thermistor	QVM800B	1			COMMON
		ELECTRICAL PARTS					
A	E1	Head (3 in One)	WY034Z	1			RQ-209MS, 409S
B	E2	DC IN Jack	QJA0207A	1			"
B	E3	AC Socket with S3	QJS0316H	1			RQ-409S
A	E4	Speaker	EAS9P70SC	1			RQ-209AS, 409S
A	E5	Condenser Microphone	WM053ZY	1			★
A	E6	Volume Knob	QGTK0009	1			RQ-209MS
C	E7	Jack Board Unit	QEJK0042	1			★
C	E8	Heat Sink Unit	QEEK0011	1			★
		CABINET PARTS					
B	G1	Body Case Assembly-Black (without Speaker)	QYBK0079W	1			★
B	(G1)	Body Case Assembly-Red (without Speaker)	QYBK0080W	(1)			★
A	G1-1	Cassette Lid	QKFK0010	1			★
B	G1-2	Cassette Ejection Spring	QBNK0017	1			RQ-209S, 436S
C	G2	Speaker Holding Metal	QKT1308	2			★
C	G3	Tapping Screw	XTN3+6	2			COMMON
B	G4	Bottom Case Assembly-Black	QYCK0060	1			★
B	(G4)	Bottom Case Assembly-Red	QYCK0061	(1)			★
C	G4-1	Battery Terminal	QJB0047	2			RQ-209S, 409S
C	G4-2	Battery Spring	QJB0004	2			"
A	G5	Battery Cover Assembly-Black	QYFK0022	1			★
A	(G5)	Battery Cover Assembly-Red	QYFK0023	(1)			★
B	G7	Handle	QKH1044	1			RQ-209S, 209DS, 209MS
C	G8	MIC Holding Metal	QTT2212	1			RQ-409S
C	G9	MIC Vibration Preventor	QBGK0021	1			"
C	G10	MIC Fixing Ring	QBG1326	4			RQ-409S

Rank	Ref. No.	Description	Part No.	Pcs/ Set	Price (Per Pce.)		Remarks
C	G11	Screw ⊕2.6×5	XSN26+5FC	2			COMMON
C	G12	Screw ⊕2.6×11	XSN26+11FC	4			"
C	G13	Tapping Screw ⊕3×8	XTN3+8R	1			"
		ACCESSORIES					
A	A1	Cassette Tape	QFT1TCANAHZ	1			COMMON
B	A2	Erase Plug	QJP0959	1			RQ-222AS, 229S, 409S
B	A3	Power Cord with Cap	QFC1065	1			RQ-409S
B	A4	Plug Adaptor	QJP0603S	1			COMMON ISO
B	A5	Carring Bag	QFKK0015	1			★
B	A6	Instruction Book	QQT0433	1			★
		PACKINGS					
C	P1	Gift Box	QPNK0061	1			★
C	P2	Inner Cushion-R	QPNK0041	1			★
C	P3	Inner Cushion-L	QPNK0042	1			★
C	P4	Dust Cover	XZB26×36A05	1			RQ-209DS, 209MS
C	P5	Accessory Box	QPW1125	1			"

RECOMMENDED STOCK OF REPLACEMENT PARTS

Rank of Part	Estimated Selling Q'ty of Tape Recorder Set					
	Less than 50	100	300	500	1,000	2,000
A rank Parts	2	5	15	20	40	80
B rank Parts	1	2	5	10	20	40
C rank Parts	0	1	3	5	10	20

Printed in Japan

ORDER NO. ARD-7606055S

Service Manual

Supplementary

Date. June 28, 1976 | No. ME-11

TAPE RECORDER

Model No.: RQ-309AS-E
RQ-310S-E
RQ-312S-E

SUBJECT: Apology for the Errors in the Specifications Shown on the Cover of the Service Manual

Although we try to take the greatest care in the preparation of all materials for service use, in order to make them most useful for you, the Service Manual for the subject models includes the errors which are described and corrected below. We deeply apologize for any inconvenience these printing errors may have caused you, and request that you make the following corrections in this Service Manual.

CORRECTION:

Although the Service Manual describes a triple power source (AC, battery, and car/boat), this is in error.
A car/boat battery cannot be used. (These models have no DC IN Jack)

Specifications (Catalog specifications for sales) for Model No. RQ-312S-E

Power requirements: AC: 90~109, 110~125, 200~219,
220~250V, 50/60Hz
Power consumption: 5W
Batteries: 6V,
(four UM-2, (R-14) size dry batteries)
~~Car/boat battery; with optional car/boat adaptor RP-914 E in Europe~~ Deletion

Specifications (Catalog specifications for sales) for Model No. RQ-310S-E

Power requirements: AC: 90~250V, 50/60Hz
DC: 6V (four "C" size batteries)
~~Car battery; with National car adaptor RP-916, optional~~ Deletion
Power consumption: 5W

Specifications (Catalog specifications for sales) for Model No. RQ-309AS-E

Power source: AC: 220 volts, 50/60Hz
DC: 6 volts (four "C" size batteries)
~~Car/boat battery (with optional car/boat adaptor RP-914E)~~ Deletion
Power consumption: 5W

We will make every possible effort to assure that mistakes such as this do not occur in the future.

National Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Printed in Japan